

Glossary of terms

provided by G. MUSCATELLO to accompany

Rhodococcus equi infection in foals: the science of 'rattles'

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16s rRNA sequencing: 16S rRNA is the genetic component of the 30S ribosomal subunit of the bacterial ribosome. It is classified as a housekeeping gene as it is essential for bacterial survival and generally well conserved within strains of the same species. The 16S rRNA gene contains regions well conserved in all bacteria that are ideal for primer design, PCR or sequencing, and sequence alignment. It is possible to design universal primers for most of the bacteria. It also contains species-specific variable regions that allow species identification. Therefore, sequence analysis of the 16S rRNA gene is utilised in bacterial identification.

Frameshift mutation: A genetic mutation that results in insertion or deletion of a number of nucleotides that is not evenly divisible by 3 from a DNA sequence. Due to the triplet nature of gene expression by codons, the insertion or deletion can disrupt the reading frame, or the grouping of the codons, resulting in a completely different translation from the original.

Iron dependent regulator gene, IdeR: The *IdeR* gene produces a protein that is a metal-dependent regulator of the DtxR (diphtheria toxin repressor) family. In the presence of iron, it binds to a specific DNA sequence in the promoter regions of the genes that it regulates, thus controlling their transcription.

Isocitrate lyase gene, aceA: The gene *aceA* produces the enzyme isocitrate lyase, the first enzyme of fatty acid metabolism through the glyoxylate shunt; in combination with malate synthase these enzymes catalyse isocitrate and acetyl-CoA to succinate and malate.

Pleomorphic: Bacteria whose cells vary in size and shape.

Polymerase chain reaction (PCR): A technique used to make many copies of a specific DNA sequence. The reaction is initiated using a pair of short primer sequences that match the ends of the sequence to be copied. Thereafter, each cycle of the reaction copies the sequence between the primers. Primers can bind to the copies as well as the original sequence, so the total number of copies increases exponentially with time.

Pulse-field gel electrophoresis (PFGE): An electrophoretic technique (technique for separating electrically charged molecules) in which the gel is subjected to electrical fields alternating between different angles, allowing very large DNA fragments to snake through the gel, permitting efficient separation of a mixture of large fragments of DNA. The DNA banding patterns generated from the PFGE of bacterial DNA digested with specified enzymes is a means of identifying and classifying strains in various bacterial species.

Real-time PCR: A technique designed to detect and quantify sequence-specific PCR products as they accumulate in 'real-time' during the PCR amplification process.

Virulence associated protein A, vapA: The *vapA* gene is found on the equine virulence plasmid of *R. equi*. This gene produces a highly antigenic 15-17 kDa lipid-modified protein expressed on the bacterium cell surface. The expression of *vapA* is thermally and pH regulated; up-regulation (increased expression) has been demonstrated within the intracellular environment of the equine macrophage. *VapA* is said to be an essential virulence factor of virulent *R. equi* as it has been demonstrated to be essential in survival, replication and pathogenesis of virulent *R. equi* in the diseased host tissue.